

## **807 JOINT MATERIALS**

### **807.01 PREFORMED EXPANSION JOINT FILLER**

**(A) FOR USE IN PAVEMENT CONSTRUCTION.** Preformed expansion joint for use in PCC pavement, base, sidewalk, curb and gutter construction and sewer-water structures shall meet the requirements of AASHTO M 153, Type II (Cork).

Preformed joint material shall be new material for all work and furnished in longest lengths practicable for intended use as determined by the Engineer, and in no case shall joint material be furnished in lengths less than 10 feet. Pieces for curb and gutter and as directed shall be cut in exact size from larger furnished sections. All splices in joint material shall be carefully made to insure against penetration of PCC between adjacent strips of joint material. Joint material shall neither be furnished nor stored in rolls.

When dowel bars or other approved load transfer devices are specified, the preformed filler shall have holes of the proper diameter or size drilled through it at the specified intervals to receive the bars and to insure a tight fit.

**(B) FOR USE IN STRUCTURES.** Preformed expansion joint filler for use in structures shall meet the requirements of AASHTO M 153, Type II or III (Cork or Self-expanding Cork).

### **807.02 JOINT SEALING MATERIALS**

#### **(A) HOT-POURED TYPE.**

**(1) ELASTIC TYPE JOINT-SEALERS.** Hot-poured sealer for PCC pavement joints shall meet requirements of AASHTO M 173; except that use of ground cured rubber scrap is prohibited. The material when tested at 77°F per AASHTO T 51 shall have a ductility of not less than 40 centimeters. Flow at 140°F shall not exceed 1.0 centimeter.

**(2) ELASTOMERIC JOINT SEALANTS.** Hot-poured elastomeric-type of one-component, hot-applied, concrete joint sealant shall meet the requirements of AASHTO M 282.

**(3) FUEL-RESISTANT JOINT SEALANT.** Hot-poured sealant for use in sealing joints and cracks in PCC pavements subject to exposure to fuels shall meet the requirements of ASTM D 3569 or ASTM D 3581.

**(4) JOINT-SEALANTS FOR PCC AND ASPHALT PAVEMENTS.** Hot-poured type sealant for use in sealing joints and cracks in PCC and asphaltic concrete pavements shall meet the requirements of ASTM D 3405.

**(B) COLD-POURED, EMULSION OR MASTIC TYPE.** Cold-pour sealer for pavement joints shall meet requirements of ASTM D 1850. These sealers shall have appropriate tinting added during manufacture if necessary to produce a resultant black coloration. Cold pour sealant for wall joints and joints other than paving joints shall meet requirements of FS TT-S-227, Type II.

**(C) CAULKING COMPOUND.** Caulking compound for structures shall meet the requirements of the FS TT-C-598.

### **807.03 LOAD TRANSFER ASSEMBLIES**

**(A) GENERAL.** The load transfer assembly for all transverse expansion and contraction joints shall be of a material and design approved prior to use. The assembly shall provide means for transfer of load across the joint by use of dowels or other approved methods. Only the dowels shall cross the joint.

Load transfer assemblies shall be one of the types shown on the standard drawings or contract plans.

Dowels for expansion joints shall be provided with a sleeve meeting the requirements of 807.03(C).

The assembly shall be a single unit and of a length equal to the width of the slab being constructed. It shall be sufficiently rigid to hold each dowel in correct position and alignment with 1/8 inch in 12 inches and to support the weight of a man such that when the weight is removed, the dowels will be within the specified position and alignment. Assemblies fabricated for use with preformed expansion joint filler shall be constructed such that the filler will be firmly held in a vertical position and in a straight line during placement of concrete.

**(B) DOWEL BARS.** When dowel bars are used, they shall be plain rounded bars of the diameters and lengths as shown on the standard drawings or contract plans.

All dowels shall meet the requirements of AASHTO M 31, Grade 40 or Grade 60. They shall be painted with paint conforming to the requirements of 811.03(E) and a coating of grease shall be applied to the operating half of the dowel.

**(C) DOWEL SLEEVES.** Dowel sleeves shall be of the dimensions as shown in the contract documents and shall fit the dowel bar snugly. One end of the sleeve shall be closed so that concrete cannot enter. The sleeve shall be indented or have suitable flange at least 1 inch from the closed end to provide a limiting stop for the sleeve when being placed on the dowel bar and to insure subsequent free movement of the dowel in the sleeve. The sleeve shall be of such rigid design that the closed end will not collapse during construction.

**(D) METAL PLATES FOR TRANSVERSE CONTRACTION JOINTS.** Metal plates for use in curb and/or gutter sections shall be 14 gauge metal sheets, or other approved materials.

### **807.04 TIE ROD ASSEMBLIES AND TIE RODS**

**(A) TIE ROD ASSEMBLY.** Tie rod assemblies shall be of the dimensions as shown in the contract documents.

The adapter shall be threaded internally such that the bars may be inserted therein, and shall be of such strength and design that it will conform to the strength requirements specified herein.

Tie rod assemblies shall conform to the requirements of AASHTO M 227, Minimum Grade 65. When tested in assembled condition in accordance with AASHTO T 244, the tie rod assembly shall conform to the tensile requirements of AASHTO M 227, Minimum Grade 65, based on the measured cross-sectional areas of the unthreaded portion of the bars.

**(B) DEFORMED STEEL TIE RODS.** Tie rods shall be deformed bars, conforming to the requirements of AASHTO M 31, Grade 40.

## 807.05 WATERSTOPS

### (A) RUBBER WATERSTOP.

(1) **DESCRIPTION.** The waterstop shall be fabricated from natural rubber, a suitable synthetic rubber, or a blend of natural and synthetic rubber, such that it shall meet the requirements of these specifications. No reclaimed rubber shall be used.

All waterstops shall be molded or extruded in such a manner that any cross section will be dense, homogeneous, and free from porosity and other imperfections. The size, shape, dimensions, and tolerances shall be as shown on the plans.

(2) **SAMPLES.** Samples of sheet material from which the waterstop is to be fabricated and samples taken from the finished waterstop proposed for use shall meet the requirements specified herein.

(a) **Samples Of Sheet Material.** A sample consisting of at least 2 square feet of material in the form of sheets 1/16 inch to 1/8 inch in thickness shall be furnished by the manufacturer with an accompanying affidavit to the effect that the sheet samples are in all respects from the same material as used in the manufacture of the waterstop proposed for use. The accompanying affidavit shall also certify that the sheet material came from the same parent stock and was cured under identical conditions of temperature and pressure and for the same length of time as the finished waterstop. Test specimens from sheet material shall be prepared as required in 807.05(A)(4).

(b) **Samples From Finished Waterstop.** A sample consisting of not less than 2 square feet shall be obtained from the finished waterstop proposed for use. Test specimens from the finished waterstop shall be prepared as required in 807.05(A)(4).

### (3) REQUIREMENTS.

(a) **Specimens From Sheet Material.** Test specimens prepared from the sheet material submitted, when tested per 807.05(A)(4), shall meet the following requirements:

<u>Physical Tests</u>	<u>Requirements</u>
Tensile Strength psi	
Original .....	2,500 minimum
After aging, not less than ..	80 percent of original
Ultimate elongation, percent .....	450 minimum

(b) **Specimens Prepared From Finished Waterstop.** Test specimens prepared from the finished waterstop proposed for use when tested per 807.05(A)(4), shall meet the following requirements:

<u>Physical Tests</u>	<u>Requirements</u>
Tensile Strength, Original, psi	2,000 minimum
Ultimate Elongation, percent	360 minimum
Hardness, IRHD	60 to 70
Water Absorption, percent by weight	5 maximum

Compression Set, percent

30 maximum

**(4) METHODS OF TEST.** Test specimens shall be of the shape and dimensions specified in the individual test methods. Test specimens prepared from the finished waterstop shall, when necessary, be buffed and reduced in thickness in accordance with Method 1111 of Federal Test Method Standard 601. The tests shall be performed in a standard laboratory with a room temperature of 73.4°F, plus or minus 1.8°F and a relative humidity of 50 percent, plus or minus 2 percent.

**(a) Tensile Strength.** The tensile strength shall be determined on the original sample in accordance with Method 4111 of Federal Test Method Standard 601. The tensile strength shall also be determined on a sample aged in air in accordance with Method 7221 and Method 7231 of Federal Test Method Standard 601.

**(b) Ultimate Elongation.** The ultimate elongation shall be determined on the original sample in accordance with Method 4121 of Federal Test Method Standard 601.

**(c) Hardness.** The hardness shall be determined on the original sample in accordance with ASTM D 1415.

**(d) Water Absorption.** The water absorption shall be determined on the original sample in accordance with Method 6251 of Federal Test Method Standard 601.

**(e) Compression Set.** The compression set shall be determined in accordance with Method 3311 of Federal Test Method Standard 601.

**(5) SPLICES.** The supplier shall furnish complete instructions concerning the manner in which splices can be made in the field to insure that the material is not damaged by heat sealing or by the application of cementing materials, and the continuity of the ribs, bulbs, protrusions, etc., shall be maintained across the splices. All splicing shall be done in strict compliance with the instructions furnished.

The tensile strength of a field splice shall be not less than 50 percent of the unspliced material when tested in accordance with 807.05(A)(4).

## **(B) POLYVINYL CHLORIDE (PVC) WATERSTOP.**

**(1) DESCRIPTION.** Polyvinyl chloride waterstops shall be manufactured from polyvinyl chloride conforming to the Corps of Engineers Specification Number CRD-C 572 and shall conform to the ozone resistance as required for neoprene waterstops. A certificate shall be furnished with the test sample supplied stating that all of the performance requirements specified under paragraph 6 of the said specifications have been satisfied. Use of reclaimed PVC is prohibited.

All waterstop shall be the size, shape, dimensions and tolerances as specified in the contract documents.

**(2) SAMPLES.** A sample consisting of not less than 2 square feet shall be obtained from each type of finished waterstop proposed for use.

**(3) SPLICES.** Field splices for polyvinyl chloride water stops shall be performed by heat sealing the adjacent surfaces in accordance with manufacturer's recommendations. A thermostatically controlled electric source of heat shall be used to make all splices. The heat shall be sufficient to melt but not char the plastic. Waterstops when being installed shall be cut and spliced at changes in direction as may be necessary to avoid

buckling or distortion of the web or flange.

## **807.06 COMPRESSION SEALS**

**(A) PREFORMED EXTRUDED COMPRESSION SEALS.** Preformed extruded compression seals shall be the shape (angled and webbed) as specified in the contract documents and shall be composed per ASTM D 2628. Adhesive for use with this seal shall be one part moisture curing polyurethane and aromatic hydrocarbon solvent mixture with the following physical properties:

Average weight per gallon	8.00 lbs +/-10
Solids content	72-74 by weight
Adhesive shall remain fluid	5°F to 120°F
Film Strength (ASTM D 412)	1200 psi
Elongation (ASTM D 412)	350%
Low Temperature Strength (ASTM D 746) -60°C, tensile	1200 psi

Each lot of adhesive shall be delivered in containers plainly marked with the manufacturer's name or trade mark and date of manufacture and shall be accompanied by an affidavit at testing conformance with this article.

**(B) O-RING SEALS** - O-ring compression seals for precast sewer manhole rings shall be per ASTM C361 or ASTM C443.

## **807.07 TILE JOINT SEALANT**

Joint sealant for ceramic wall tile shall conform to the requirements of Federal Specification TT-S-227b, Class B.